

ABSTRACT

The invention relates to a microfabricated device for the rapid detection of DNA, proteins or other molecules associated with a particular disease. The devices and methods of the invention can be used for the simultaneous diagnosis of multiple diseases by detecting molecules (*e.g.* amounts of molecules), such as polynucleotides (*e.g.*, DNA) or proteins (*e.g.*, antibodies), by measuring the signal of a detectable reporter associated with hybridized polynucleotides or antigen/antibody complex. In the microfabricated device according to the invention, detection of the presence of molecules (*i.e.*, polynucleotides, proteins, or antigen/antibody complexes) are correlated to a hybridization signal from an optically-detectable (*e.g.* fluorescent) reporter associated with the bound molecules. These hybridization signals can be detected by any suitable means, for example optical, and can be stored for example in a computer as a representation of the presence of a particular gene. Hybridization probes can be immobilized on a substrate that forms part of or is exposed to a channel or channels of the device that form a closed loop, for circulation of sample to actively contact complementary probes. Universal chips according to the invention can be fabricated not only with DNA but also with other molecules such as RNA, proteins, peptide nucleic acid (PNA) and polyamide molecules.

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